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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: WELCHES, Richard Shaun Group Art Unit:

Serial No. Examiner:

Filed: Herein Atty. Dkt. No: YOU21A-US

FOR: TRANSFORMERLESS, LOAD ADAPTIVE SPEED CONTROLLER

To: Mail Stop Patent Application
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

From: 24222

CERTIFICATE OF MAILING 37 CFR 1.10: I certify that this correspondence is being deposited on the below date with the U.S. Postal Service with sufficient postage as EXPRESS MAIL POST OFFICE TO ADDRESSEE addressed to: Mail Stop Patent Application, Commissioner for Patents, PO Box 1450, Alexandria, VA22313-1450.{PRIVATE }

Date: 22 OCT 2003 [ ] ~~Debra A. Stengel~~ or [✓] Scott J. Asmus, Reg. No. 42,269

Dear Honorable Commissioner:

PETITION TO MAKE SPECIAL
37 CFR 1.102 (c) (MPEP 708.02)

Pursuant to 37 C. F. R. 1.102 (c), the Applicant wishes to advance the examination of the patent application filed herein. The Applicant respectfully submits that the present invention materially contributes to the more efficient utilization and conservation of energy resources. Submitted herewith is a statement made under 37 C.F. R. 1.102(c) wherein the present invention's material contribution to the more efficient utilization and conservation of energy resources is explained.

As this petition is made under 37 C.F. R. 1.102 (c) the Applicant respectfully submits that no fee is required for this petition.

Respectfully submitted,

Vernon C. Maine, Reg. No. 37,389
Scott J. Asmus, Reg. No. 42,269
Neil F. Maloney, Reg. No. 42,833
Andrew P. Cernota, Reg. No. 52,711
Attorneys/Agents for Applicant

Cus. No. 24222
Maine & Asmus
PO Box 3445
Nashua, NH 03061-3445
Tel. No. (603) 886-6100, Fax. No. (603) 886-4796
Info@maineandasmus.com

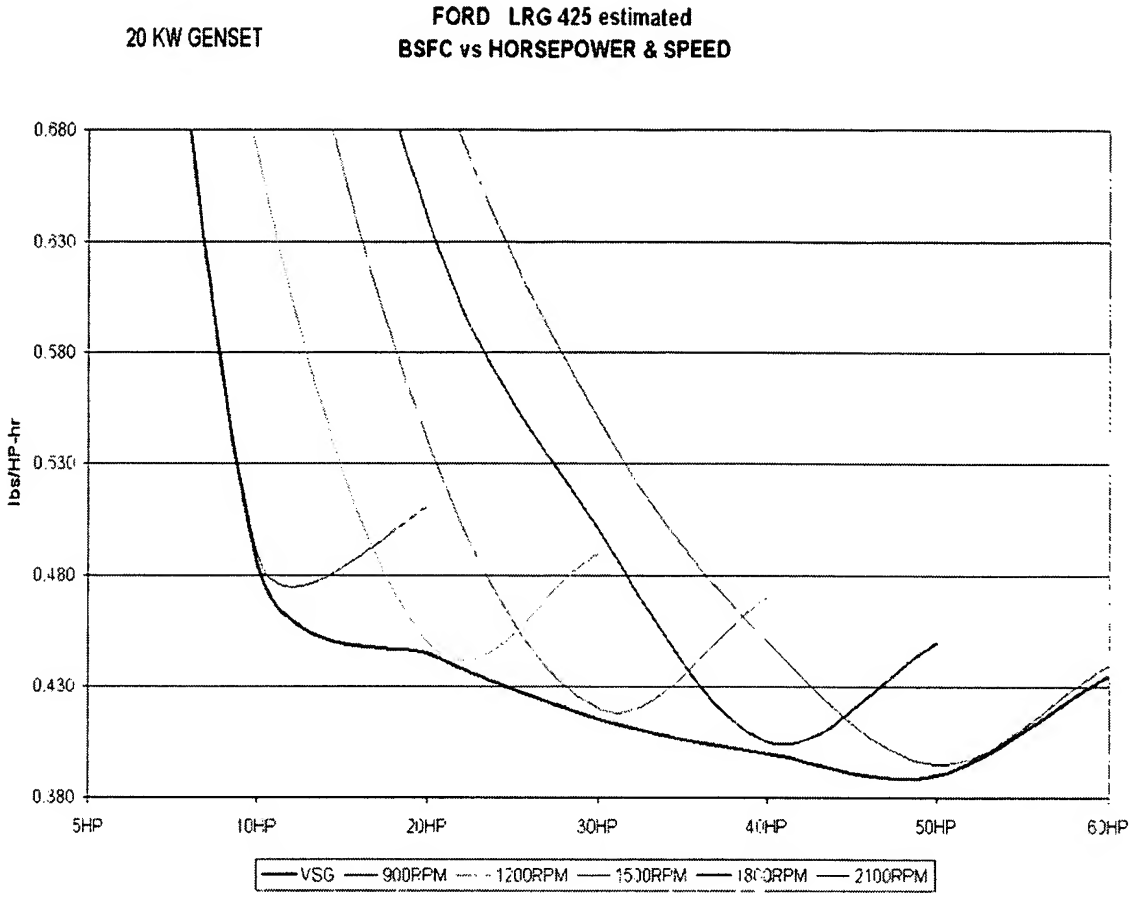
STATEMENT OF RICHARD SHAUN WELCHES

Overview of VSG (variable speed generator), and HYBRID VSG/UPS technology

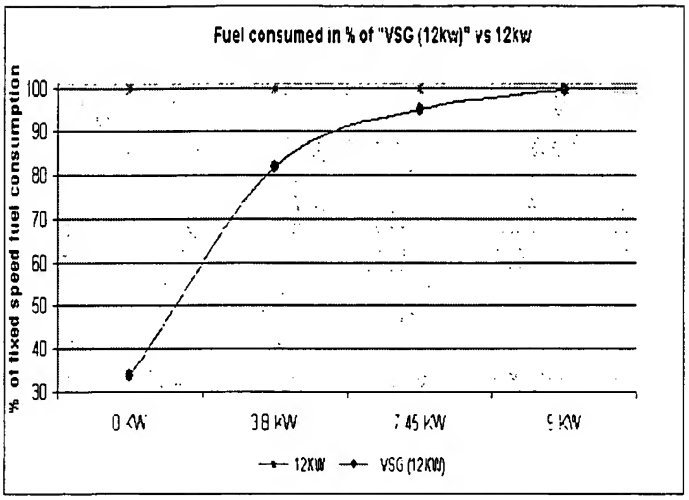
Summary: The YOUTILITY VSG & HYBRID VSG/UPS technology provides an important new way to utilize a traditional engine generator set. The main benefits are substantial fuel efficiency improvements (as much as 20%), emissions reductions, as well as sound reduction (noise pollution). The technology closest to ours, for comparison, is the hybrid electric vehicle. The same general principles apply. Our technology applies to natural gas, LPgas, or even diesel type engines. Further, our apparatus may be installed on any existing genset (retrofits) thereby providing these benefits immediately at a relatively low initial cost.

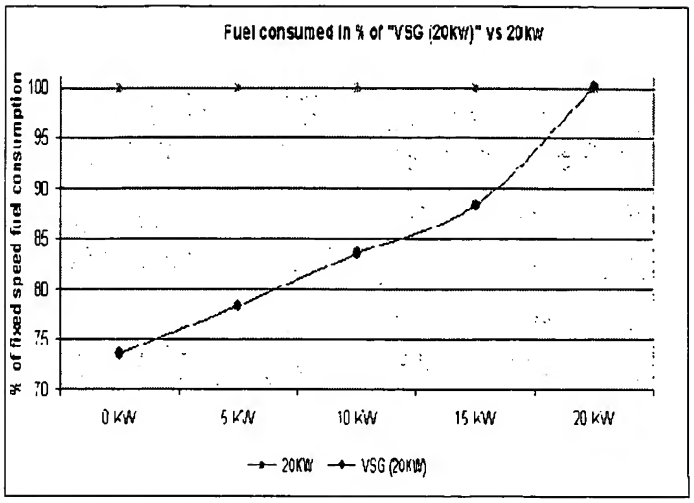
BASIC PRINCIPLES OF OPERATION

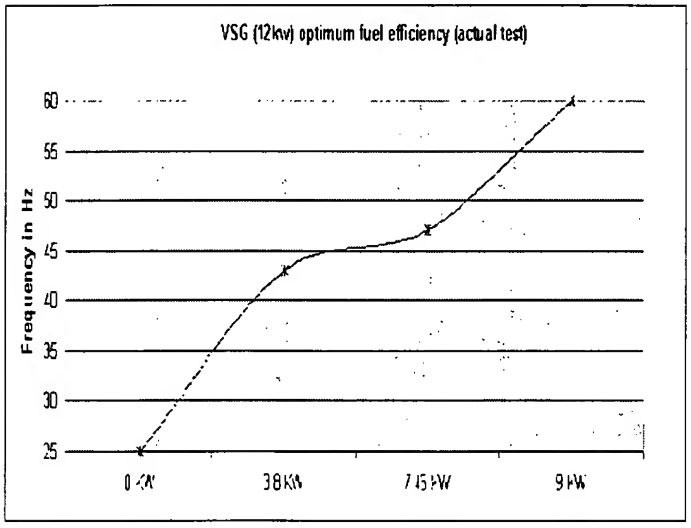
The YOUTILITY VSG & HYBRID VSG/UPS technology adjusts the engine speed to the output electrical load. For light loads, the engine runs at low speeds, for large loads the engine runs at higher speeds. This allows the VSG & HYBRID VSG/UPS to operate the engine at it's maximum BSFC (brake specific fuel consumption) for any given load. Further, through use of this technology it is normally possible to reduce the engine generator size, further reducing fuel consumption and emissions/kWhr produced.

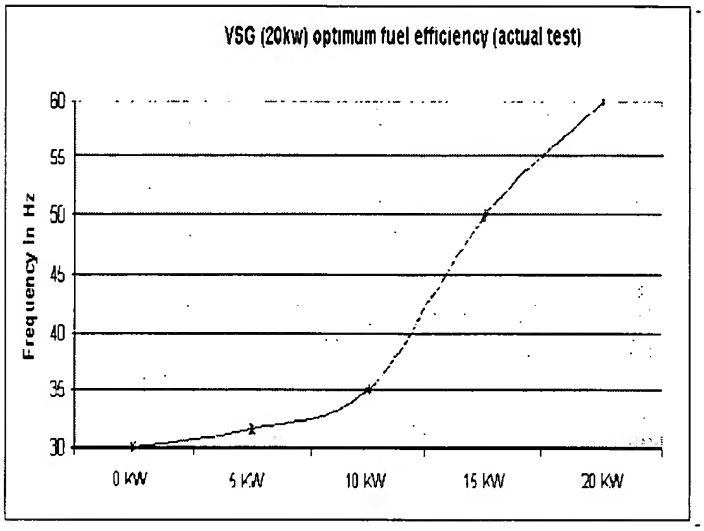


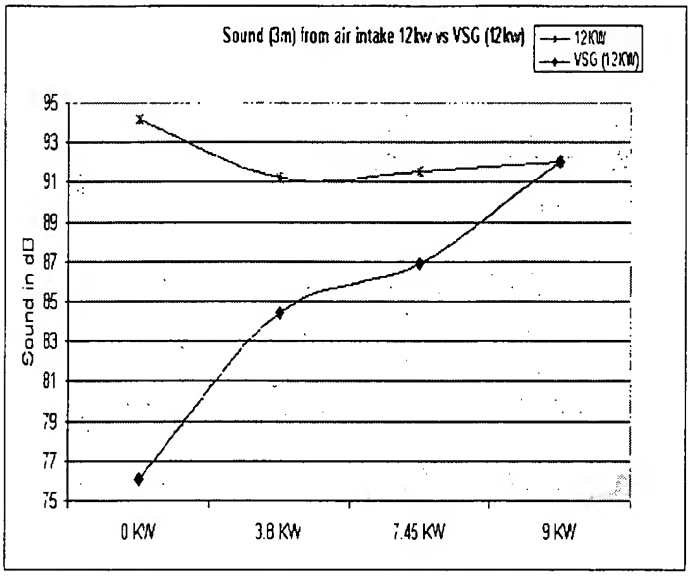
ACTUAL TEST RESULTS FOR (12KW 3600rpm), & (20KW 1800rpm) GENSETS


Fuel consumed in % of "VSG (12kw)" vs 12kw
% of fixed speed fuel consumption
100
90
80
70
60
50
40
30
0 KW
3.8 KW
7.45 KW
9 KW
12KW
VSG (12KW)


Fuel consumed in % of "VSG (20kW)" vs 20kW
% of fixed speed fuel consumption
100
95
90
85
80
75
70
0 KW
5 KW
10 KW
15 KW
20 KW
20KW
VSG (20KW)


VSG (12kw) optimum fuel efficiency (actual test)
Frequency in Hz
60
55
50
45
40
35
30
25
0 KW
3.8 KW
7.45 KW
9 KW


VSG (20kw) optimum fuel efficiency (actual test)
Frequency in Hz
60
55
50
45
40
35
30
0 KW
5 KW
10 KW
15 KW
20 KW


Sound (3m) from air intake 12kw vs VSG (12kw)
12KW
VSG (12KW)
Sound in dB
95
93
91
89
87
85
83
81
79
77
75
0 KW
3.8 KW
7.45 KW
9 KW

ENGINE GENERATOR (GENSET) SIZING

The YOUTILITY VSG technology allows the use of the "right-size" engine generator sets for most applications. The industry typically "over-sizes" engine generator sets to solve a variety of very common problems such as non-linear or harmonic loads, induction motor starting (large current inrush), etc. This means the genset is normally running at part load, and part load fuel efficiency, as well as emissions are very poor. Fuel consumption per KWhr produced may be increased by as much as 50%, or even more. Of course this also negatively impacts emissions/kWhr.

What makes this possible is the VSG power converter's ability to provide a very low output impedance voltage. Thus a 50KW VSG has an output impedance lower than a typical 200KW genset. We can therefore supply 100% of the genset's output power capability to very harmonic loads (rectifiers etc), with no de-rate. A typical genset de-rate is 60-70 %.

Another advantage is the VSG power converter's ability to provide very high overload currents for short duration (400% typical) while keeping the transient voltage sag within industry accepted limits. This allows for induction motor starting capability 200-250% greater than an equivalent sized genset. This allows the VSG equipped genset to start very difficult motor, compressor, and air-conditioner type loads, very near the maximum continuous power capability of the genset. Thus the genset may then run near full load (at optimum BSFC for the engine.

DISTRIBUTED GENERATION

TheYOUTILITY VSG & HYBRID VSG/UPS also provides for very easily controlled and regulatory compliant distributed generation. Soft, or high impedance locations in the utility grid, or even critical nodes can connect a VSG equipped genset, thereby providing a synthetically reduced grid impedance near the connection node. This reduces strain on the existing "copper and steel" infrastructure by absorbing a disproportionately larger amount of the harmonic currents which are normally sourced by the grid. Further, re-

synchronization of the multitude of separate utility grid sources, after a cascading fault/system shutdown, would benefit from the VSG technology in the following ways...

1) The VSG can rapidly switch from acting as a grid connected current source, to a stand alone voltage source. Thereby proving power to at least some of the more critical disconnected feeders. This also simplifies the grid "re-start" in that sections of block loads are already being supplied by VSG gensets, so when the grid re-connects, it won't have to feed as many large load steps.
2) The VSG can also sense when the utility line comes back and quickly re-synchronize to the utility grid, and shift back into a grid connected current source mode.

The undersigned declares further that all statements of his own knowledge made herein are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application of any patent issuing thereon.

Respectfully submitted this 22OCT2003,

Richard Shaun Welches
Inventor